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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,599	11/24/2003	Paul Rothman	CC-0681	5042
7590	11/18/2005		EXAMINER	
Robert D. Crawford CiDRA Corporation 50 Barnes Park North Wallingford, CT 06492			KHUU, HIEN DIEU THI	
			ART UNIT	PAPER NUMBER
			2863	

DATE MAILED: 11/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/720,599

Applicant(s)

ROTHMAN ET AL.

Examiner

Cindy D. Khuu

Art Unit

2863

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 7-8, 11-14, 17-18, and 21-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,7,8,11,17,18,21,22,30 and 31 is/are rejected.
- 7) ☒ Claim(s) 2, 12-14, 23-29, and 32-35 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/1/05 & 10/20/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) The invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-4, 7-8, 11, 17-18, 21-22 and 30-31 are rejected under 35 U.S.C. 102(e) as being anticipated by Gysling et al. (US 2004/0069069).

With respect to claims 1 and 11, Gysling discloses a method and apparatus of determining an average flow rate ($U_f(t)$) of a fluid flowing in the pipe (paragraph 177, lines 8-9), said method comprising: measuring unsteady pressures using an array of sensors, wherein each sensor is spaced at different axial locations along the pipe (paragraph 56, lines 3-6); determining in response to the measured unsteady pressures, a measured flow rate of the fluid flow (paragraph 57); and relating the measured flow rate to the average flow rate of the fluid flow using a calibration correction function (paragraph 185) based on non-dimensional parameters (Reynolds or calibration constant/offset) that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine the average flow rate (paragraph 185, lines 1-7).

With respect to claim 3, Gysling further discloses the method determining the average volumetric flow rate (Q) of the fluid flow based on the equation:

$$Q = A * U_{av},$$

where A is a cross sectional area of the pipe's inner diameter and U_{av} is the average flow rate (paragraph 170).

With respect to claim 4, Gysling further discloses the method relating the measured flow rate to the average flow rate includes determining the average flow rate (U_{av}) based on the equation:

$$U_{av} = \text{the calibration correction function} * U_{meas},$$

where U_{meas} is a measured flow rate (paragraph 185).

With respect to claims 7 and 17, Gysling further discloses the method and apparatus wherein the measured flow rate of fluid flow is determined by measuring a slope of a convective ridge in a $K-\omega$ plane (Fig. 39).

With respect to claims 8 and 18, Gysling further discloses the method and apparatus wherein the sensors of the array of sensors include strain sensors or pressure sensors (paragraph 115).

With respect to claims 21 and 30, Gysling further discloses the method and apparatus wherein the array of sensors include at least 3 sensors (Fig. 2, Ref. 18-21).

With respect to claims 22 and 31, Gysling further discloses the method and apparatus wherein the array of sensors are clamped onto the pipe (Fig. 11, paragraph 27).

Allowable Subject Matter

Claims 2, 12-14, 23-29, and 32-35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art of record, taken alone or in combination, fails to disclose or render obvious, which makes the following claims allowable over the prior art:

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With respect to claims 2, 12, 23-26 and 32, the method and apparatus, wherein the calibration correction function depends on a ratio t/D of the pipe wall thickness (t) and the pipe inner diameter (D); a Reynolds number that characterizes the fluid flow in the pipe; a ratio $\Delta x/D$ of the sensor spacing (Δx) and the pipe inner diameter (D); and a ratio $f\Delta x/U_{\text{meas}}$ of usable frequencies in relation to the sensor spacing (Δx) and the measured flow rate (U_{meas}).

With respect to claims 27 and 33, the method and apparatus, wherein the calibration correction function is defined by a calibration curve, the calibration curve being defined by an equation:

$$\text{Offset} = C_0 + C_1/RE^{C_2},$$

Wherein Offset is the correction in percentage, RE is the Reynolds number of the fluid, and C_0 , C_1 and C_2 are constants to define the calibration curve, which are related to the non-dimensional parameters.

With respect to claims 29 and 35, the method and apparatus, wherein a common calibration correction function is used to determine the average flow rate for meters having similar sensor spacing, used on pipes having similar inner diameters and wall thickness, and measuring fluids having similar Reynolds numbers.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and; to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

Applicant's arguments filed October 20, 2005 have been fully considered but they are not persuasive.

Applicant have amended the independent claims 1 and 11 to include the limitation of "using a calibration correction function based on non-dimensional parameters that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine the average flow rate." And further include "an array

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of sensors for measuring unsteady pressures wherein each sensor is spaced at different axial locations along the pipe".

Regarding the 35 U.S.C. 102 rejections, Applicant argues that Baumel (US 6,026,693), Lynnworth (US 5,179,862) or Gimson (US 2004/0149027), does not teach or suggest a flow meter or method having such features as amended by applicant.

However, Examiner's position after reconsidering the amended claims that Gysling discloses a method and apparatus of determining an average flow rate ($U_f(t)$) of a fluid flowing in the pipe (paragraph 177, lines 8-9), said method comprising: measuring unsteady pressures using an array of sensors, wherein each sensor is spaced at different axial locations along the pipe (paragraph 56, lines 3-6); determining in response to the measured unsteady pressures, a measured flow rate of the fluid flow (paragraph 57); and relating the measured flow rate to the average flow rate of the fluid flow using a calibration correction function (paragraph 185) based on non-dimensional parameters (Reynolds or calibration constant/offset) that characterize the array of sensors, the pipe, and the fluid flowing in the pipe to determine the average flow rate (paragraph 185, lines 1-7).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Gysling (WO 00/00793), Gysling et al. (US 6,862,920), Gysling et al. (US 6,354,147), Gysling (US 2002/0095263).

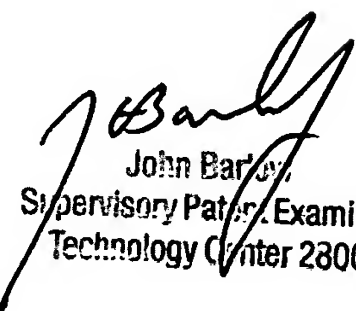
Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cindy D. Khuu whose telephone number is (571) 272-8585. The examiner can normally be reached on M-F, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CAH 11/7/05


John Barlow
Supervisory Patent Examiner
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